

FIGURE 4-A BLOCKING CAPACITOR ADAPTER

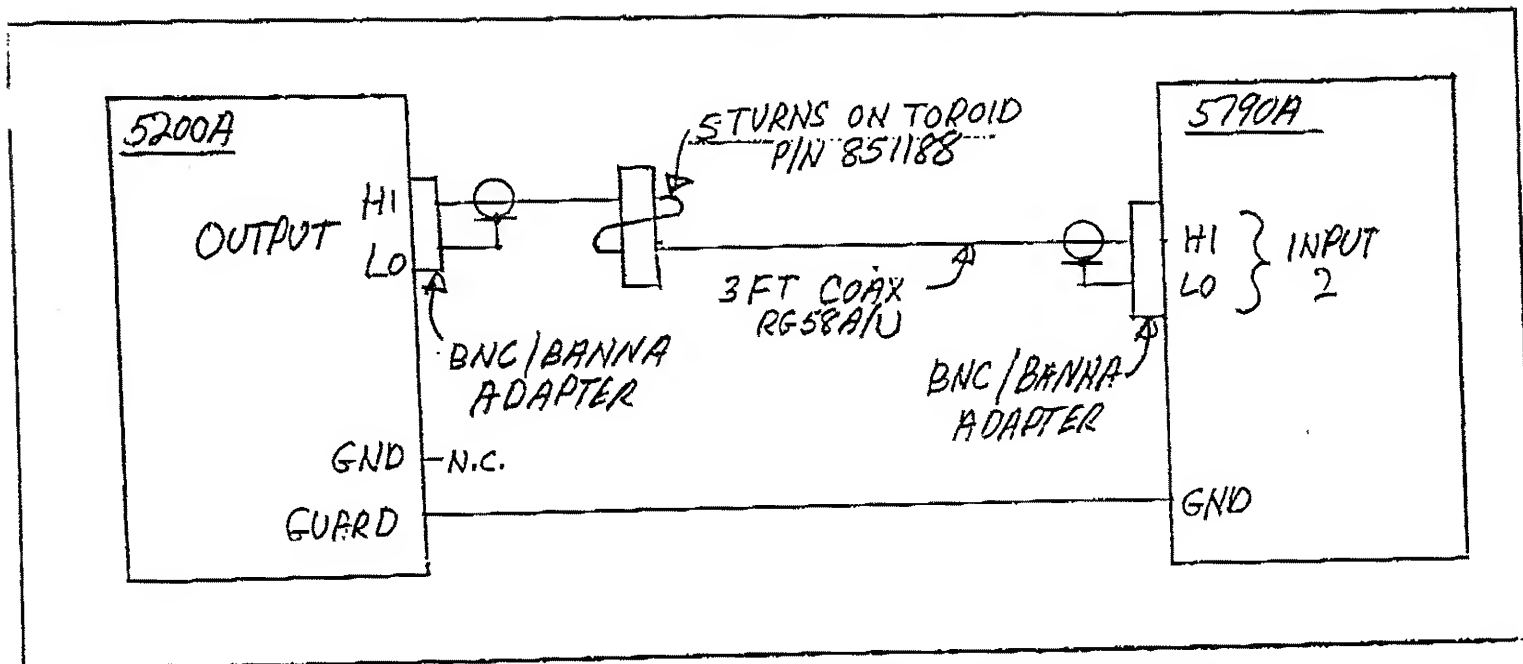


FIGURE 4-4a 10mV OUTPUT ACCURACY
EQUIPMENT CONFIGURATION

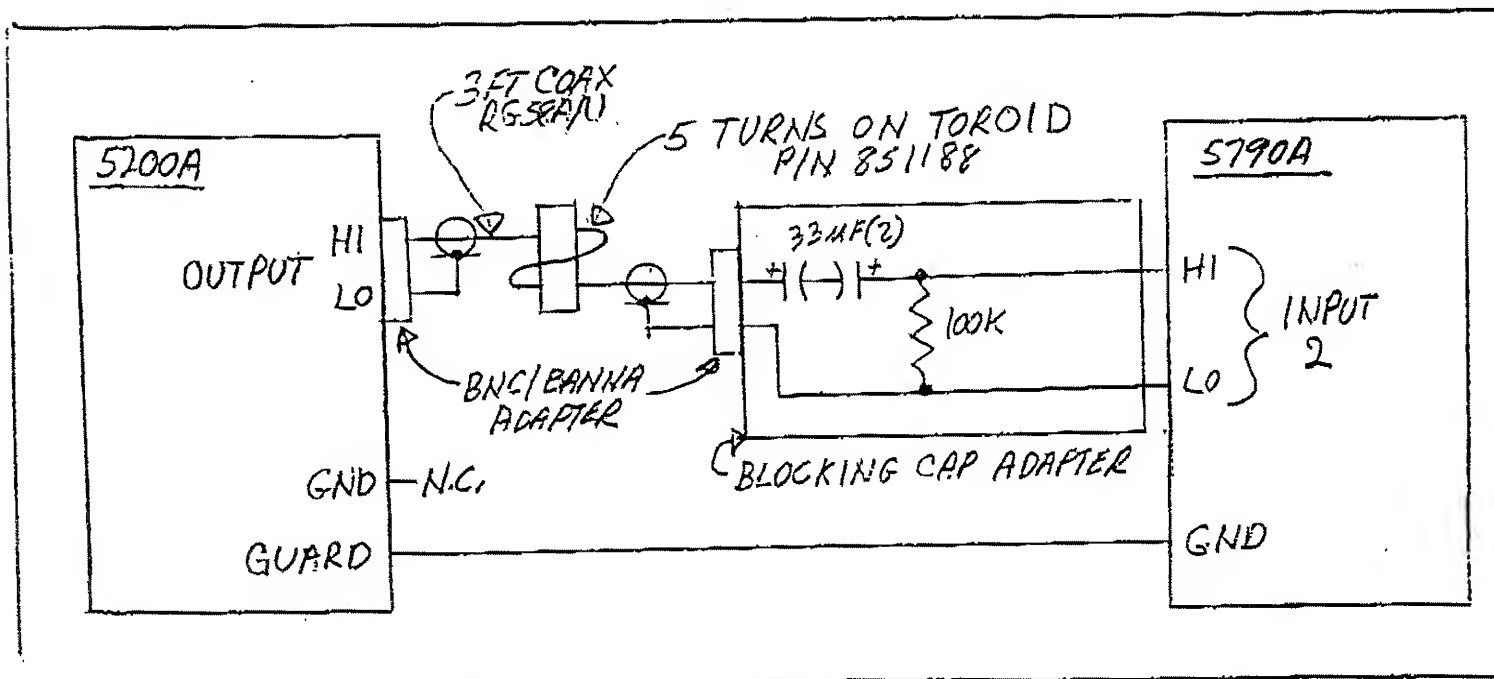


FIGURE 4-4b 1mV OUTPUT ACCURACY
EQUIPMENT CONFIGURATION

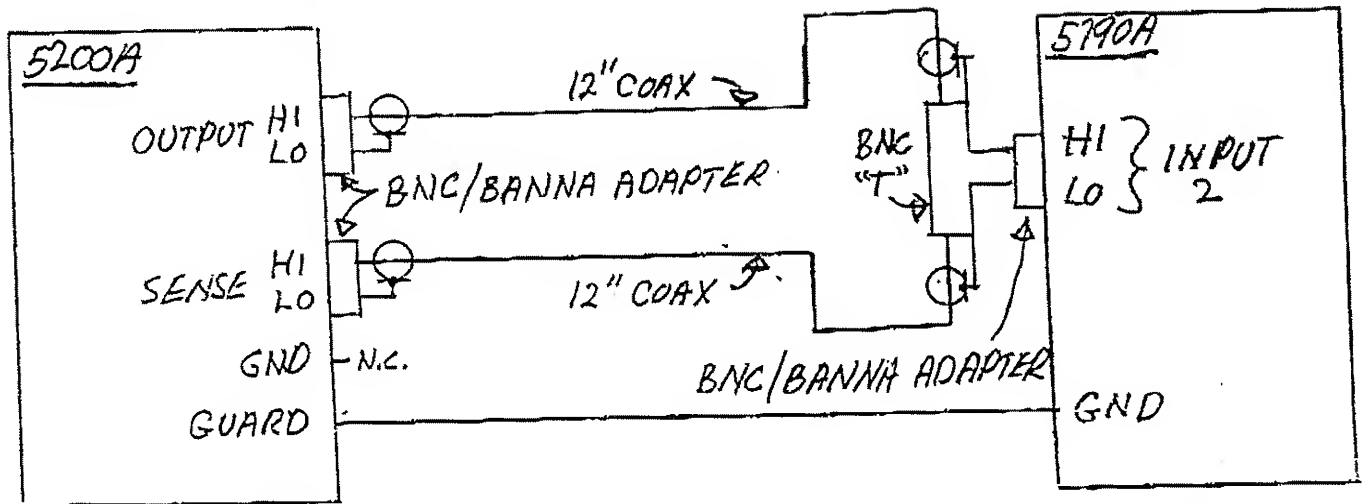


FIGURE 4-3a 1V, 10V, 100V OUTPUT ACCURACY
EQUIPMENT CONFIGURATION

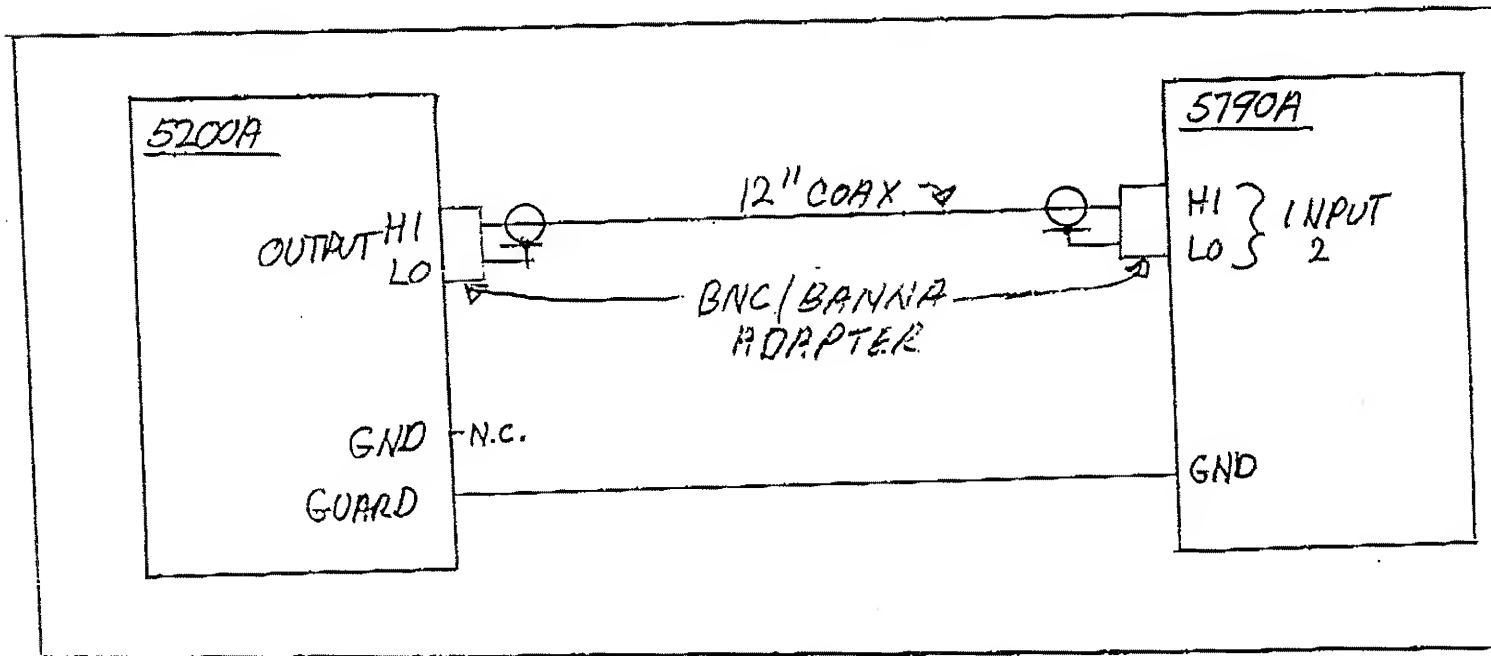


FIGURE 4-3b 100 mV OUTPUT ACCURACY
EQUIPMENT CONFIGURATION

The following procedures are intended to replace the OUTPUT ACCURACY TESTS and the VOLTAGE ERROR CONTROL TEST under the PERFORMANCE VERIFICATION CHECKS section of the 5200A manual and also the VOLTAGE AND MILLIVOLT AMPLITUDE LIBRATION and the ERROR CONTROL CALIBRATION under the CALIBRATION PROCEDURES section of the 5200A manual, when using a 5790A AC MEASUREMENT STANDARD as the measurement device. All other verification and calibration procedures sections of the manual will be used as written or revised.

ADDITIONAL TEST EQUIPMENT REQUIRED:

Fluke Model 5790A AC MEASUREMENT STANDARD

ADDITIONAL TEST ACCESSORIES REQUIRED:

Ferrite toroid core (p/n 851188).
 3 foot coax cable-RG58A/U with BNC male connectors.
 Blocking capacitor adapter (two 33uf 6V tantalum capacitors and a 100K ohm metal film resistor mounted on a Pomona model 1837 plug). See figure 4-A.

4-30a. OUTPUT ACCURACY TEST-VOLTAGE RANGES

- Connect the equipment as shown in Figure 4-3a.
- Insure the equipment set-up procedure in paragraph 4-28 has been performed.
- Suggested representative voltage and frequency combinations are given in Table 4-3a, along with accuracy tolerances.
- To give a direct error read-out on the 5790A a reference voltage must be set. To do this, select the desired voltage from the 5200A at 1kHz, and set the MODE switch to OPER. Adjust the 5200A voltage if necessary to give the exact desired reading on the 5790A display (+/- 10 counts) and push the SET REF soft key. Push the soft key under the error display units to give PCT. Reset the 5200A to the desired output voltage. The 5790A is now ready to measure the 5200A output at the selected voltage at any frequency and display the error.
- Perform the measurements at frequencies desired.
- Repeat steps d and e for other desired voltage and frequency combinations.

Table 4-3a OUTPUT VOLTAGE ACCURACY TEST TOLERANCES

| FREQ/RANGE | VOLTS/RANGE | | | |
|-----------------|-------------|---------|---------|-------------|
| | 1/1 | 1/10 | 10/10 | 100/100 |
| 1kHz/1kHz | ±0.02% | ±0.04%* | ±0.02%* | ±0.02%* |
| 20 kHz/100 kHz | ±0.02% | ±0.04% | ±0.02% | ±0.02% |
| 100 kHz/100 kHz | ±0.05% | ±0.10% | ±0.05% | ±0.05% |
| 1MHz/1MHz | ±0.33%* | ±0.66%* | ±0.33% | NOT ALLOWED |

* These points are adjusted during the calibration procedure.

Table 4-4a. MILLIVOLT RANGES OUTPUT ACCURACY TESTS TOLERANCES

| | 10Hz-30Hz (0.1% + 10 μ V) | 30Hz-20kHz (0.02% + 10 μ V) | 20kHz-100kHz (0.05% + 20 μ V) | 0.1MHz-1.0MHz (0.33% + 30 μ V) |
|---|----------------------------------|------------------------------------|--------------------------------------|---------------------------------------|
| 100mV on 100mV range | $\pm 0.11\%$ | $\pm 0.03\%$ | $\pm 0.07\%$ | $\pm 0.36\%^*$ |
| 10mV on 10mV range | $\pm 0.2\%$ | $\pm 0.12\%$ | $\pm 0.25\%$ | $\pm 0.63\%$ |
| 1mV on 1mV range | $\pm 1.1\%$ | $\pm 1.02\%$ | $\pm 2.05\%$ | $\pm 3.33\%$ |
| <p>*Subtract the following capacitance loading error from the measured readings before comparison to the test tolerance:</p> <p>5790A cap loading error in % = $0.08 \left(\frac{f \text{ MHz}}{1 \text{ MHz}} \right)^2$</p> | | | | |

j. Connect the equipment as shown in Figure 4-4b.

i. Set the 5200A to 1mV on the 1mV range.

l. To give a direct error read-out on the 5790A a reference voltage must be set. To do this, for the 1mV range, set the 5200A to 1mV on the 1mV range at 1KHz, and set the MODE switch to OPR. Adjust the 5200A output voltage if necessary to give the exact reading of 1.0000mV (+/- 2 counts) and push the SET REF soft key. Push the soft key under the error display units to give PCT. Reset the 5200A to 1mV. The 5790A is now ready to measure the 5200A output at the selected frequency and display the error.

m. Perform the measurements at the frequencies desired. The readings should not be greater than the value listed for the voltage/frequency selected in Table 4-4a.

4-56. VOLTAGE ERROR CONTROL TEST

a. Insure that the equipment set-up procedure in paragraph 4-28 has been performed.

b. Connect the equipment as shown in Figure 4-3a.

c. Set the 5200A for an output of 10 volts on the 10 volt range and at 1KHz on the 1KHz range.

d. Set the MODE switch to OPER.

e. Push the SET REF soft key on the 5790A.

f. Set the VERNIER dial to 0.00 and the VOLTAGE ERROR-% switch to X1.

4-36a. OUTPUT ACCURACY TEST-MILLIVOLT RANGES

- a. Connect the equipment as shown in Figure 4-3b.
- b. Insure the equipment set-up procedure in paragraph 4-28 has been performed.
- c. Set the 5200A to 100mV on the 100mV range.

NOTE!

Internal sensing is automatic on the
5200A millivolt ranges.

- d. To give a direct error read-out on the 5790A a reference voltage must be set. To do this, for the 100mV range set the 5200A to 100mV on the 100mV range at 1KHz, and set the mode switch to OPR. Adjust the 5200A output voltage if necessary to give the exact reading of 100.0000 mV (+/- 10 counts) and push the SET REF soft key. Push the soft key under the error display units to give PCT. Reset the 5200A to 100mV. The 5790A is now ready to measure the 5200A output at the selected frequency and display the error.
- e. Perform the measurements at the frequencies desired. The readings should not be greater than the values listed for the voltage/frequency selected in Table 4-4a.

NOTE!

With internal sensing on the millivolt ranges capacitive loading causes an increase in the 5200A output in the 100KHz to 1MHz range. This increase in output is due to external capacitance being placed in parallel with internal inductance, resulting in a parallel tuned circuit. The nominal calibration is at the end of the 1 foot cable with 36pf capacitance load. The 5790A input capacitance is 64pf, and therefore causes a 0.08% increase in the output at 1MHz. Subtract this error from the 5790A error reading before applying the test tolerance. Errors at other frequencies can be calculated from the equation below the table.

- f. Connect the equipment as shown in Figure 4-4a.

- g. Set the 5200A to 10mV on the 10mV range.

- h. To give a direct error read-out on the 5790A a reference voltage must be set. To do this, for the 10mV range, set the 5200A to 10mV on the 10mV range at 1KHz, and set the MODE switch to OPR. Adjust the 5200A output voltage if necessary to give the exact reading of 10.0000 mV (+/- 2 counts) and push the SET REF soft key. Push the soft key under the error display units to give PCT. Reset the 5200A to 10mV. The 5790A is now ready to measure the 5200A output at the selected frequency and display the error.
- i. Perform the measurements at the frequencies desired. The readings should not be greater than the values listed for the voltage/frequency selected in Table 4-4a.

- g. The 5790A error display should still read 0 +/-0.01%.
- h. Set the VOLTAGE ERROR-% switch to X.1.
- i. The 5790A error display should still read 0 +/- 0.001%.
- j. Check the end point accuracy of the vernier by setting the VERNIER dial to +3.00 and the VOLTAGE ERROR-% switch to X.1.
- k. The 5790A error display should read between -2.9800% and -3.0200%.
- l. Set the 5200A VOLTAGE ERROR-% switch to X.1.
- m. The 5790A error display should read between -0.2980% and -0.3020%.
- n. Check the other end point accuracy of the vernier by setting the VERNIER dial to -3.00 and the VOLTAGE ERROR-% switch to X.1.
- o. The 5790A error display should read between +2.9800% and +3.0200%.
- p. Set the 5200A VOLTAGE ERROR-% switch to X.1.
- q. The 5790A error display should read between +0.2980% and +0.3020%.
- r. Return the 5200A VERNIER to 0.00 and the VOLTAGE ERROR-% switch to OFF.

4-76a. VOLTAGE AMPLITUDE AND LINEARITY CALIBRATION

- 4-77a. The following procedural sub-paragraphs deal with voltage amplitude and linearity for the 1V, 10V, and 100V ranges. The equipment should be connected as shown in Figure 4-3a, with both inner covers installed. Adjustments are made through the marked ports in the instrument compartment inner cover as shown in Figure 4-6. Perform the tests in sequence, insuring that the equipment set-up procedure in paragraph 4-28 has been performed prior to starting the test.

4-78a. LOW FREQUENCY ZERO AND GAIN CALIBRATION.

- a. Set the 5200A output to 1 volt on the 10 volt range and 1 KHz on the 1 KHz range.
- b. Set the mode switch to OPER.
- c. The 5790A should read 1.000000 +/- 0.000050 volts.
- d. Adjust INT ZERO (R63, AC/DC Converter pcb) until the reading is within tolerance.
- e. Set the 5200A output to 10 volts on the 10 volt range and 1KHz on the 1 KHz range.
- f. The 5790A should read 10.00000 +/- 0.00050 volts.
- g. Adjust REF (R48, Reference pcb) until the reading is within tolerance.
- h. Repeat steps a through g until both readings are within tolerance without adjustment.

- a. Connect the equipment as shown in Figure 4-3b.
- b. Set the 5200A output to 100 millivolts on the 100 millivolt range and 1MHz on the 1MHz range.
- c. Set the MODE switch to OPER.

NOTE!

Internal Sensing is automatic
on the 5200A millivolt ranges.

- d. Adjust the 100mV HIGH FREQ (L1, Attenuator pcb) if necessary to give a 5790A reading of 100.0800 mV \pm 0.0020 mV.

NOTE!

The output at 1MHz is purposely
adjusted 0.08% high in order to
compensate for the input capacity
of the 5790A.

- e. Connect the equipment as shown in Figure 4-4a.
- f. Set the 5200A output to 10 millivolts on the 10 millivolt range and 1MHz on the 1MHz range.
- g. Set the MODE switch to OPER.
- h. Adjust the 10mV HIGH FREQ (R12, Attenuator pcb) if necessary to give a reading of 10.0000 \pm 0.0005 mV.
- i. Connect the equipment as shown in Figure 4-4b.
- j. Set the 5200A output to 1 millivolt on the 1 millivolt range and 1MHz on the 1MHz range.
- k. Adjust the 1 mV HIGH FREQ (R11, Attenuator pcb) if necessary to give a reading of 1.0000 \pm 0.0010 mV.

4-85a. ERROR CONTROL CALIBRATION.

4-86a. Use the following procedure for the Error Control calibration:

- a. Connect the equipment as shown in Figure 4-3a, insuring that both inner covers are installed and secured and the equipment set-up procedure in paragraph 4-28 has been performed.
- b. Set the 5200A to 10 volts on the 10 volt range and 1KHz on the 1KHz range.
- c. Set the MODE switch to OPER.
- d. Push the SET REF soft key on the 5790A.
- e. Set the VERNIER dial to 0.00 and the VOLTAGE ERROR-% switch to X1.

4-79a. 100 VOLT LOW FREQUENCY CALIBRATION.

- a. Set the 5200A output to 100 volts on the 100 volt range and 1KHz on the 1KHz range.
- . Adjust 100V (R9, Attenuator pcb) if necessary to give 100.0000 +/- 0.0050 volts.

4-80a. HIGH FREQUENCY ZERO CALIBRATION.

- a. Set the 5200A output to 1 volt on the 10 volt range and 1MHz on the 1 MHz range.
- b. Adjust HIGH FREQ ZERO (R89, AC/DC Converter pcb) if necessary to give a 5790A reading of 1.000000 +/- 0.000100 volts.

4-81a. HIGH FREQUENCY GAIN CALIBRATION.

- a. Set the 5200A output to 1 volt on the 1 volt range and 1MHz on the 1MHz range.
- b. Adjust HIGH FREQ GAIN (R91, AC-DC Converter pcb) if necessary to give a 5790A reading of 1.000000 +/- 0.000100 volts.
- c. Repeat paragraphs 4-80a and 4-81a until both the HIGH FREQ ZERO and HIGH FREQ GAIN are within tolerance.

4-82a. HIGH FREQUENCY 100V RANGE CALIBRATION.

- a. Set the 5200A output to 10 volts on the 100 volt range and 1MHz on the 1MHz range.
- b. Adjust 100V HIGH FREQ (C3, Attenuator pcb) if necessary to give a 5790A reading of 9.96700 volts +/- 0.00500 volts.

NOTE!

The output at 1 MHz is purposely adjusted 0.33% low in order to optimize accuracy at lower frequencies.

4-83a. MILLIVOLT AMPLITUDE CALIBRATION.

- 4-84a. The following procedural sub-paragraphs deal with voltage amplitude and linearity for the 1mV, 10mV, and 100mV ranges. The inner covers must be installed and firmly secured for these tests. Adjustments are made through the marked ports in the instrument compartment inner cover as shown in Figure 4-6. Perform the tests in sequence insuring that the equipment set-up procedure in paragraph 4-28 has been performed prior to starting the test.

- 00 01 01 11:11 FROM 1-255 1011/011 1-030
- f. Adjust ERROR CONTROL ZERO (R75, Reference pcb) if necessary to get an error display on the 5790A of 0.0 ± 50 ppm.

Check the adjustment by rotating the VOLTAGE ERROR-% switch between X1 and OFF positions. The 5790A error display should remain at 0.0 ± 50 ppm.

NOTE!

The toroid and blocking capacitor adapter are required during calibration ONLY, due to equipment characteristics. During NORMAL USE the 100mV range is specified at the end of the 12 inch RG-58A/U cable and the 10mV and 1mV ranges are specified at the end of the 3 foot RG-58A/U cable. The 1v, 10v, and 100v ranges are specified with 1 foot output and sense RG-58A/U coax cables and with EXT SENSE.